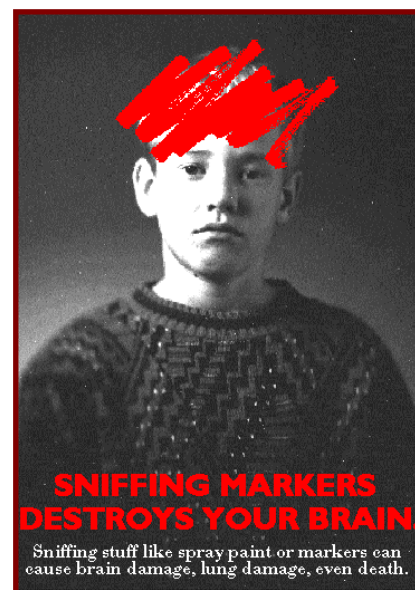


# Inhalant Prevention Education

A School-Based Program



## Introduction to Inhalant Prevention Education

The 2006 NSDUH Survey noted that 604,476 twelve-eighteen year olds used inhalants for the first time. According to the 2006 Monitoring the Future report, even though many drugs showed a decline in use, inhalants did not. Abuse can start in elementary years and peaks in middle school. Inhalant abuse is dangerous and education should start before abuse peaks in eighth grade.

Inhalants are not actually drugs. They are breathable chemical vapors or gases, (toxins) that produce psychoactive effects when misused. Most inhalants are readily available, inexpensive or free, and usually legal to purchase and possess. Many youth do not perceive them as harmful and don't understand the consequences. To learn more about inhalants prior to teaching this lesson, please take the 15-minute, free, online training at [www.inhalantabusetraining.org](http://www.inhalantabusetraining.org) . For more information about inhalants contact your poison center at 1-800-222-1222.

This set of lessons is designed to introduce inhalant prevention education as part of a health or science curriculum that touches on the negative effects of pollution. There is some thinking that including inhalants in a drug prevention course may increase experimentation. For this reason, these lessons address inhalant prevention from a science perspective. There are three lessons:

1. Poison Prevention (Grade 4)
2. Body Pollution (Grade 5)
3. Danger! Toxic Chemicals (Grade 6 and above)

Lesson 3 is the only time inhalants are actually discussed and should not be presented in the 4<sup>th</sup> or 5<sup>th</sup> grade.

A combination of the above the lesson plans (4. Toxic Chemicals and Poison Prevention) is also included to be used as a solo presentation in grades 6 and above.



Photo credit: [www.drugabuse.gov](http://www.drugabuse.gov)

## Lesson 3. Danger! Toxic Chemicals

**Grade level** 6 and above

**Duration** 45 minutes

### Description

One in five U.S. teens has used inhalants at least once. Hundreds of young students suffer negative consequences, and even die, from inhalants. Students are attracted to inhalants for several reasons: 1) they are legal; 2) they are inexpensive; 3) because they are legal, young people perceive inhalant use as a lower risk than drugs; 4) peer pressure; and 5) low self-esteem. Inhalant use usually peaks in eighth grade. It is important for students to know the facts about inhalants, the negative effects of these toxic products, and refusal skills to lessen the pressure to use these toxins. Research shows parents often do not talk about inhalants with their children. We have included both a parent/student internet and a non-internet homework activity (Appendix F).

### Subjects covered

- Science (anatomy and physiology)
- Safety
- Injury prevention
- Substance abuse prevention

### Utah State Board of Education, Utah Core State Standards for Health Education

*Strand 4. Substance Abuse Prevention (SAP): Students will develop skills to educate themselves about the consequences of substance use and practice ways to resist negative peer pressure.*

*Standard 6.SAP.3: Recognize potential physical, mental, emotional, and social short and long-term consequences of alcohol, tobacco, nicotine, and other substance use.*

### Goal

This lesson will help students understand brain functions and how inhalants (toxins) can interfere with normal brain function. Students will learn that chemicals in inhalants are poisonous, and that these toxic products were never meant to be inhaled.

### Objectives

**By the end of the lesson, students will be able to**

1. **identify the function of the 4 major parts of the brain.**

2. **label the 3 main parts of a neuron (cell body, axon and dendrite).**
3. **understand the effects of inhalants on brain structures, physiology and behavior.**
4. **propose possible means to eliminate or reduce environmental exposure from toxins and social pressure to abuse toxic products.**

### Materials

1. Pencils for each student
2. Butcher paper or poster board
3. Cross section view of a brain NIDA Junior Scientist: Grades 4-5 (Appendix A)
4. Cut up the task cards and apply to heavier card stock for durability (Appendix B)
5. Enlarge the neuron (Appendix C) and mount on poster board
6. Mind over Matter – The Brain’s Response to Inhalants student handout download material at [http://teens.drugabuse.gov/mom/mom\\_inha1.asp](http://teens.drugabuse.gov/mom/mom_inha1.asp) and click on the “PDF Version” button on the left.
7. Brain MRI image – Appendix D
8. *Danger! Toxic Chemicals*: Hazelden video ([www.hazelden.org](http://www.hazelden.org)) 1-800-328-9000. In Utah, call 1-800-222-1222 to checkout a copy of the video.
9. **Call the Poison center at 1-800-222-1222 or visit [www.utahpoisoncontrol.org](http://www.utahpoisoncontrol.org)** to order Poison Control stickers and magnets.
10. Makes copies of
  - o In class assignment – Danger! Toxic Chemicals Worksheet (Appendix E)
  - o Take home assignment – Internet toluene and family member project.(Appendix F)
11. Pictionary Clues (Appendix G)
12. Jeopardy game (Appendix H)

### Procedure

#### **(Bold text is spoken)**

#### *Objective 1*

Show a side-view cross-section of the brain (Appendix A). Label the 4 main parts: cerebral cortex, cerebellum, brain stem, and limbic system. On the chalkboard or flip chart, create 4 squares and write the parts of the brain in them (see chart below). Under each part, list the major functions that each part controls.

<p><b>Cerebral Cortex</b></p> <p>Thinking</p> <p>Perceiving</p> <p>Vision</p> <p>Movement</p> <p>Reasoning</p> <p>Artistic expression</p>	<p><b>Cerebellum</b></p> <p>Movement</p> <p>Balance</p> <p>Posture</p> <p>Playing ball</p> <p>Playing a musical instrument</p>
<p><b>Brain Stem</b></p> <p>Heart rate</p> <p>Breathing</p> <p>Eating</p> <p>Sleeping</p> <p>Body temperature</p> <p>Digestion</p>	<p><b>Limbic System</b></p> <p>Learning</p> <p>Memory</p> <p>Regulates emotions</p> <p>Pleasure</p> <p>Motivation</p>

Ask for 6 volunteers to come up to the front of the class. Give each student a card with a task on it. Ask each student, one at a time, to perform their task. Each task should use a different part of the brain (Appendix B), such as:

- Solve this math problem:  $12 \times 11$  (cerebral cortex)
- Breathe heavily (brain stem)
- Hop on one foot (cerebellum)
- Pick up a pencil (cerebellum)
- Draw a box (cerebral cortex)
- Recall what you had for dinner last night (limbic system)

As each student performs their task, ask the class to raise their hand if they know what part of the brain controls that task.

Explain what the brain is and how inhalants can damage the brain.

**Did you know that the brain acts like a computer? It processes all the information it receives and then responds to it. Your brain controls virtually every human experience, including movement, regulating involuntary body processes that are necessary for life, and controlling emotions. Anything that affects the way the brain functions will have a major effect on our entire being.**

**Inhalants are one of the things that can affect our brain functions and the rest of our body.**

**Inhalants are toxic chemicals, not illegal drugs. These are common household products that are deliberately breathed into the body. The fumes of these toxic products enter the body through the lungs and get transferred to the bloodstream. The blood carries these poisons to major organs, particularly the brain.**

### *Objective 2*

**Throughout your brain and body, you have billions of nerve cells called neurons. We are going to discuss what a neuron looks like and how it works.** (Display in an appropriate place in the classroom the image of the nerve fiber on the back of the inhalant student handout and the nerve cell in Appendix C.) **Nerve cells in your brain and spinal cord are sort of like the “command central” for your body. They send and receive messages that control just about everything you think and do.**

Review the parts of the nerve cell and discuss their function.

### **There are three main parts of a nerve cell**

1. Central cell body – Directs all activities of the neuron (includes the nucleus)
2. Dendrites – Short fibers that receive messages from other neurons and relay them to the cell body
3. Axon – Long single fiber that transmits messages from the cell body to the dendrites of other neurons or to body tissues, such as muscles.
  - The axon of many cells is covered in a fatty substance known as myelin. Myelin has several functions. One of its most important functions is to increase the rate at which nerve impulses travel along the axon. The rate of conduction of a nerve impulse along a heavily myelinated axon can be as fast as 120 meters a second. In contrast, a nerve impulse can travel no faster than about 2 meters a second along an axon without myelin. The axons that transmit messages from the brain or spinal cord to muscles and other body tissues are what make up the nerves of the human body. Most of these axons contain a thin covering of myelin, which accounts for the whitish appearance of nerves.

Have the students trace their arm from elbow to fingers on butcher paper and label the different parts of the neuron:

- Palm of the hand – Central cell body
- Fingers – Dendrites
- Arm and elbow - Axon

*Objective 3*

**Poisons affect the brain differently. When chemicals in products are smelled** (especially in concentrated amounts) **they can damage the brain and nerve cells.** (Show MRI of brain damage, Appendix D) **Household products never were intended to be taken into the body. There is no safe dose of these poisons.**

Hand out the MOM handout - **We are going to take turns reading a paragraph from the inhalant handout.**

**Now we will see a video that discusses the facts about inhalants, discusses the connection of toxins in household products to environmental toxins, reviews the short and long term effects of inhalant use, highlights a personal story, and offers refusal skills.**

Hand out the Danger! Toxic Chemicals Worksheet found in Appendix E. Have students fill in the worksheet while they watch the video.

Show video – 14 minutes

*Objective 4*

After the video, have the students break up into groups and discuss the following 4 questions (examples of some potential answers are provided below each question). Have the groups report back their answers.

- 1. What happens when the environment becomes polluted?**
  - a. Wildlife and vegetation die or get sick
- 2. What are some toxic effects from fumes?**
  - a. Loss of brain power
  - b. Trouble speaking
  - c. Memory loss
  - d. Headache
  - e. Blindness
  - f. Death
- 3. Why do firefighters wear protective gear?**
  - a. Protect body from flames
  - b. Protect lungs from fumes
- 4. What are 3 refusal skills strategies highlighted in the movie?**
  - a. Identify hot situations

- b. State your case
- c. Move away from the situation

### Assessment

- Discussion wrap-up. Reinforce the ways toxins can harm the body and ways to protect it.
- Ask the students **“Can you tell me the top 3 things you learned today?”**
- Ask the students to take home the stickers and magnets and be sure to put them near telephones.

### Homework - See Appendix F

Homework 1 (for those with internet access)

Homework 2 (for those without internet access)

Interview family members

Have the students ask four different people what their favorite activity is. Then have the students determine what part of the brain is responsible for that activity.

### Take the lesson one step further

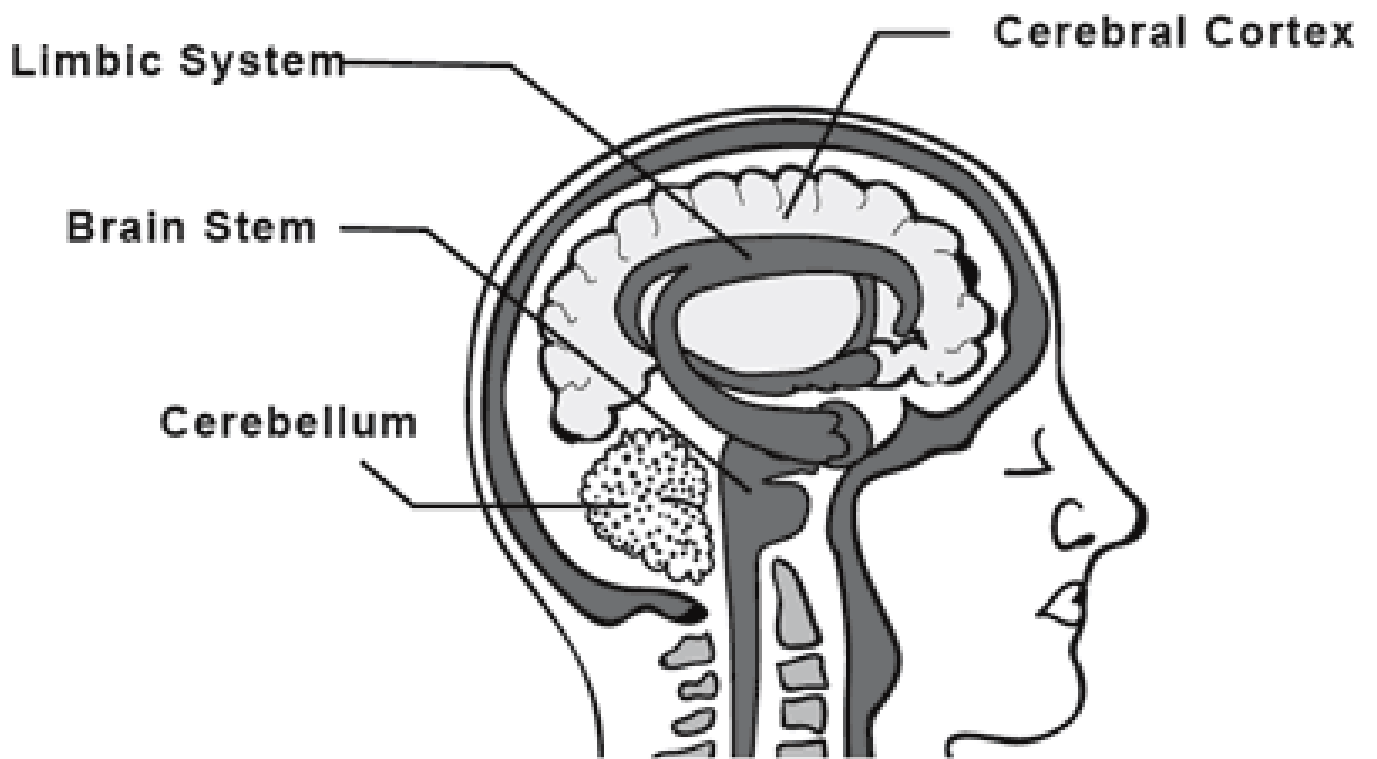
- Have the students develop a campaign or write an article for the school paper on “Keeping Household Products Safe.”
- Have the students write a poem, song, or public service announcement about something they learned today.
- Have the students analyze an advertisement of a household product that would be dangerous to breathe in (e.g., paint, permanent markers) and identify missing important safety information. Have the students develop warning labels for several products.
- Play Jeopardy (Appendix G)
- Play Pictionary (Appendix H)

### Resources

- Utah Poison Center 1-800-222-1222 [www.utahpoisoncontrol.org](http://www.utahpoisoncontrol.org)
- Mind over Matters, The Brain’s Response to Drugs: Teachers Guide - [http://teens.drugabuse.gov/mom/tg\\_inha1.asp](http://teens.drugabuse.gov/mom/tg_inha1.asp)
- NIDA Junior Scientist: Grades 4-5 <http://www.nida.nih.gov/JSP3/MOD2/page3.html>
- U.S. National Library of Medicine - Tox Town Website: [www.toxtown.nlm.nih.gov](http://www.toxtown.nlm.nih.gov)
- SAMHSA [https://www.samhsa.gov/data/sites/default/files/report\\_3095/ShortReport-3095.html](https://www.samhsa.gov/data/sites/default/files/report_3095/ShortReport-3095.html) , Lipari, R.N. *Understanding adolescent inhalant use*. The CBHSQ Report: June 13, 2017. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, Rockville, MD.



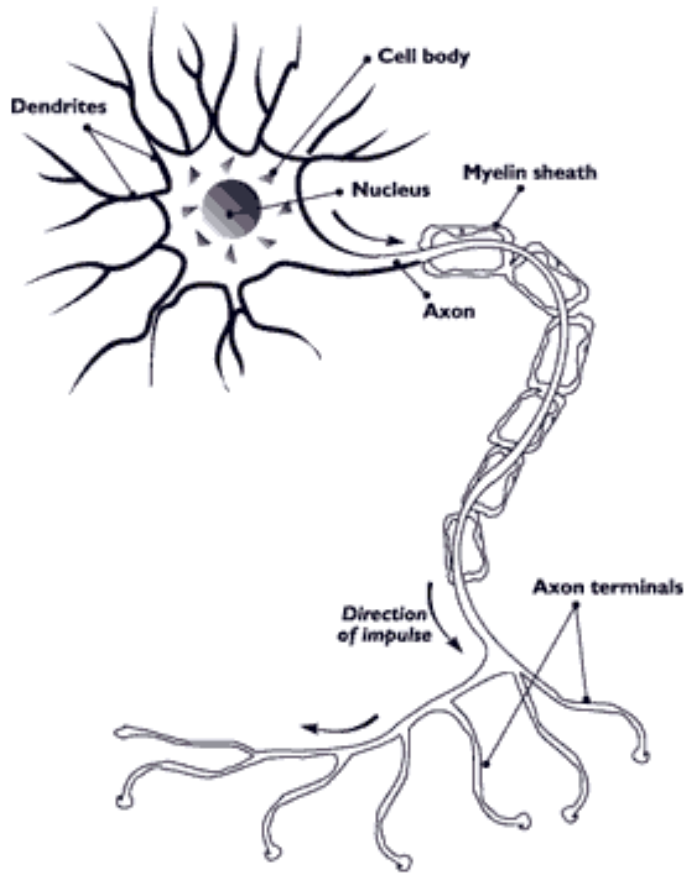
Appendix A



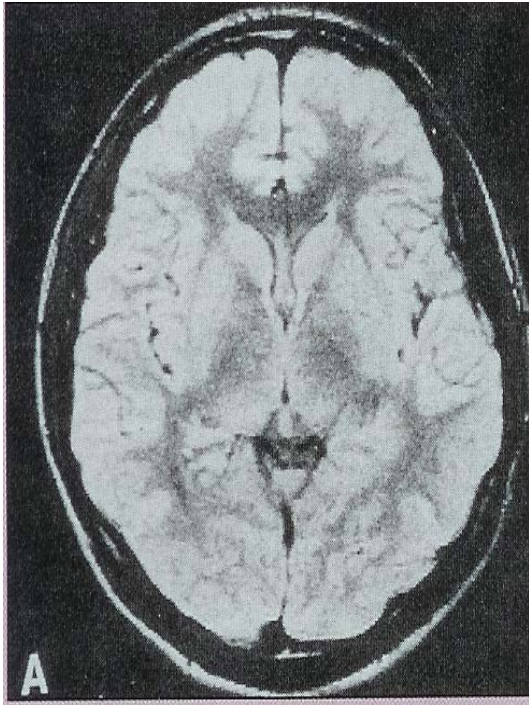
Appendix B – Task Cards

<p><b>Solve this math problem.</b></p> <p><b>12 x 11 =</b></p>	<p><b>Breathe heavily.</b></p>
<p><b>Hop on one foot.</b></p>	<p><b>Pick up a pencil.</b></p>
<p><b>Draw a box.</b></p>	<p><b>Tell the class what you ate for dinner last night.</b></p>

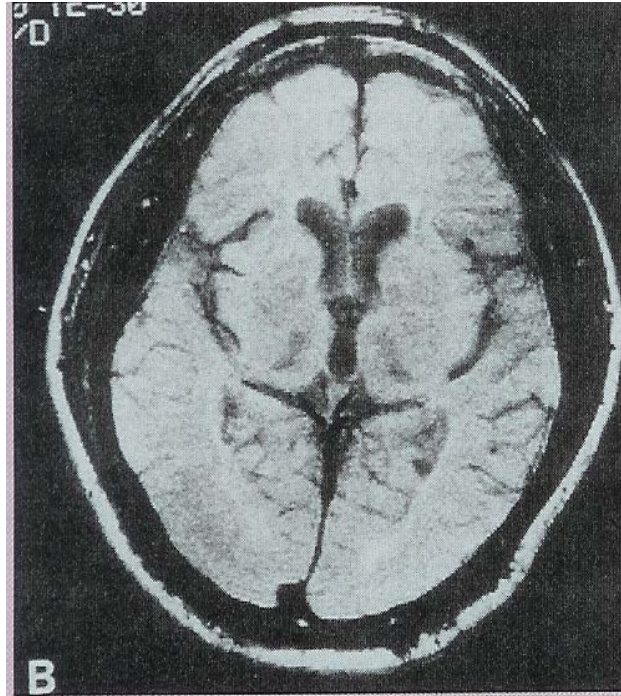
Appendix C



Appendix D



**HEALTHY BRAIN**



**UNHEALTHY BRAIN  
CHRONIC TOLUENE USER**

## Appendix E

Name: \_\_\_\_\_

**Danger! Toxic Chemicals  
Worksheet**

1. Slang terms for inhaling are \_\_\_\_\_ and \_\_\_\_\_.
2. When a toxic chemical is inhaled, it enters the body through the lungs and is then transferred to the \_\_\_\_\_.
3. Unexpected immediate death due to inhaling is called \_\_\_\_\_.
4. List 3 negative consequences of sniffing toxic chemicals:
  - a.
  - b.
  - c.

True or false:

5. \_\_\_ In spray cans, the propellant that pushes out the product is toxic.
6. \_\_\_ Inhalants are classified as a drug.
7. \_\_\_ You can die the very first time you inhale a toxic chemical.
8. \_\_\_ After toxic chemicals are inhaled, they remain in the lungs and do not travel to other parts of the body.
9. \_\_\_ Memory loss is one of many possible consequences of inhaling toxic chemicals.

Short essay:

10. You are with friends and several members of the group think that it would be fun to sniff a toxic chemical. Based on the information presented in the video, describe how you would resist the pressure to engage in this dangerous behavior.



Appendix E

Danger! Toxic Chemicals – Answers

1. sniffing, huffing
2. bloodstream
3. sudden sniffing death syndrome
4. blurred vision, difficulty breathing, irregular heart beats, brain damage
5. T
6. F
7. T
8. F
9. T
10. Essay points: identify hot situations, state your case, move on out

Name: \_\_\_\_\_

**Homework – Internet Activity**

Research the latest information about a toxic substance. On the web, go to <http://www.atsdr.cdc.gov> . Click on Toxic Substances under the Toxic Substances & Health subjects on the left side of the screen. Click on Toxic Substances Portal, and then select Toluene from the list of substances. On the Toluene page, select Public Health Statement bullet. Read the 5 page document. Answer the following questions:

1. You can be exposed to toluene by \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, or through \_\_\_\_\_ contact.
2. T or F You can only be exposed to toluene by breathing it.
3. List 4 products with toluene.
4. Toluene can have serious effects on what organ?
5. Toluene can cause what health problems?
6. Toluene can cause death by interfering with the way you \_\_\_\_\_ and the way your \_\_\_\_\_.
7. If you deliberately breathe toluene during pregnancy, your baby can have \_\_\_\_\_ and retard mental abilities and \_\_\_\_\_.



Appendix F

Internet Activity Answers

1. breathing, eating, drinking, skin
2. F
3. paints, paint thinner, fingernail polish, lacquers, adhesives, rubber
4. brain
5. headaches, confusion, memory loss
6. breathe, heart beats
7. birth defects, growth



Appendix

Name: \_\_\_\_\_

**Homework – Non-Internet Family Activity**

Find four people to interview. Ask each of them what their favorite activity is and then decide what part of the brain is responsible for that activity.

1. Person's name -

Activity –

What part of the brain is responsible -

2. Person's name -

Activity –

What part of the brain is responsible –

3. Person's name -

Activity –

What part of the brain is responsible -

4. Person's name –

Activity –

What part of the brain is responsible -



## Appendix G

**Pictionary Clues**

<b>Sick</b>	<b>Fan</b>	<b>Inhalants</b>
<b>Neuron (Nerve cell)</b>	<b>Cerebral cortex</b>	<b>Limbic system</b>
<b>Cerebellum</b>	<b>Brain stem</b>	<b>Fumes</b>
<b>Pollution</b>	<b>Paint</b>	<b>Fingernail polish</b>
<b>Glue</b>	<b>Spray cans</b>	<b>Brain</b>
<b>Computer</b>	<b>Axon</b>	<b>Dendrite</b>
<b>Flame</b>	<b>Lungs</b>	<b>Headache</b>

## Appendix H

**Jeopardy Questions and Answers****Answers in Bold****Brain**

100. A. This is a part of the brain.

**Q. What is the Cerebellum?**

Q. What is the thyroid?

Q. What is the liver?

200. A. Use this part of the brain to play basketball, walk a tightrope, and play the trumpet.

Q. What is the Brain Stem?

Q. What is the Cerebral Cortex?

**Q. What is the Cerebellum?**

300. A. Artistic ability comes from this part of the brain.

Q. What is the Brain Stem?

**Q. What is the Cerebral Cortex?**

Q. What is the Limbic System?

400. A. Some people say love comes from the heart, but it really comes from this part of the brain.

**Q. What is the Limbic System?**

Q. What is the Brain Stem?

Q. What is the Cerebellum?

**Nerves**

100. A. Nerve cells in the brain and body are called this.

Q. What are axons?

**Q. What are neurons?**

Q. What are dendrites?

200. A. Short fibers that receives messages from other neurons.

Q. What are neurons?

Q. What are axons?

**Q. What are dendrites?**

300. A. Long single fiber of the nerve that transmits messages from the cell body to the dendrites of other neurons or body tissues, such as muscles.

**Q. What is an axon?**

Q. What is a dendrite?

Q. What is a neuron?

400. A. Fatty substances that covers the axon of a nerve.

Q. What are lipidites?

**Q. What is myelin or myelin sheath?**

Q. What is cellulite?

**Inhalants**

100. A. When someone's heart stops because they abused inhalants.

Q. What is a short trip?

Q. What is a stroke?

**Q. What is sudden sniffing death?**

200. A. Slang terms for inhalant abuse.

**Q. What is huffing and sniffing?**

Q. What is sneezing and wheezing?

Q. What is blowing and tripping?

300. A. When a toxic chemical is inhaled, it enters the body through the lungs and then travels to this important organ.

Q. What is the stomach?

Q. What are the kidneys?

**Q. What is the brain?**

400. A. Three negative consequences of sniffing toxic chemicals.

Q. What are 1) red eyes, 2) ears ring, 3) brown teeth?

**Q. What are 1) memory loss, 2) death, 3) burns (there are many more)?**

Q. What are 1) fuzzy hair, 2) pink tongue, 3) puffy cheeks?

**Just Say "No"**

100. A. What to do if someone you care about is abusing inhalants.

**Q. What is tell a trusted adult?**

Q. What is keep it a secret?

Q. What is leave them alone?

200. A. What a friend can do if they want to help someone stop inhalant abuse.

Q. What is tell everyone at school?

Q. What is hide all toxic products?

**Q. What is tell a trusted adult?**

300. A. What you tell a friend if they tell you inhalants are safe.

**Q. What is sudden sniffing death is real and you can die the first time?**

Q. What is okay I'll try some?

Q. What is maybe you are right?

400. A. Three main refusal steps you can use if someone asks you to try inhalants.

Q. What are: 1) make popcorn, 2) sing a song, 3) whistle?

Q. What are 1) yell for help, 2) start dancing, 3) ring a bell?

**Q. What are: 1) identify hot situations, 2) tell them the dangers, 3)**

**suggest a safer alternative?**

Final Jeopardy A. Specialist in Poison Information

**Q. Who are pharmacists and nurses?**

Q. Who are volunteers who answer the phones?

Q. Who are the primary users of the poison center services?